

Return Firmly

DEPARTMENT OF COMPUTER SCIENCE

CMPT 250.6

Midterm Exam

CLOSED BOOK Nov. 18, 1996

Time: 50 minutes

Marks:

- 13 1. Consider an ADT for a sequence, called $SEQ[T]$ where T denotes a generic parameter. Design a reasonable set of operations for such an ADT (with suitable assertions/axioms), and illustrate each operation with T representing a character. Specify the interface for each operation.
- 10 2. What features distinguish an object-oriented programming language such as Eiffel from a traditional procedural language such as Standard Pascal, C, or FORTRAN? Briefly explain each feature and state how each feature may support the development of higher-quality software systems.
- 12 3.a) What is client-supplier contracting?
b) What are the obligations and benefits for the client and for the supplier?
c) What role do assertions play in this model?
d) Explain and illustrate the key notions/ideas.
- 15 4. Given two linked binary trees whose root nodes are denoted by $T1$ and $T2$, respectively with the following node structure:

LPTR	INFO	RPTR
------	------	------

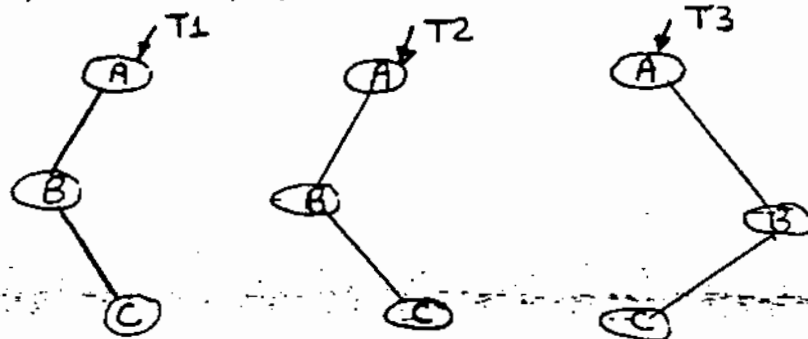
formulate a detailed recursive function $EQUAL$ (as an algorithm or a program in Pascal or Eiffel) that returns true if both trees are identical, i.e.,

a) they have identical structure, and

b) corresponding nodes have the same information contents;

or false, otherwise.

For example, for the trees $T1$, $T2$, and $T3$:



$T1$ and $T2$ are equal while $T2$ and $T3$ are not.